



Langley Research Center's

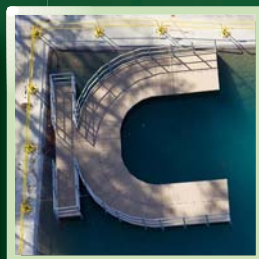
The Landing and Impact Research Facility (LandIR)

The Landing and Impact Research Facility (LandIR) vehicle structural testing complex was previously known as the Lunar Landing Research Facility (LLRF). The facility became operational in 1965, allowing astronauts Neil Armstrong and Edwin "Buzz" Aldrin to train for the final 150-foot Apollo 11 descent to the moon's surface in 1969. Since the Apollo days, this national historical landmark has been renamed LandIR and repurposed to provide crucial research test data on the impact dynamics of subscale and full-scale test articles. The test articles include, but are not limited to: fixed wing and rotary wing aircraft, spacecraft, military assemblies, race cars, and fuel systems.

The LandIR is comprised of three features: the A-frame gantry, the Hydro Impact Basin (HIB), and the Vertical Test Apparatus (VTA).

Gantry testing involves lifting a test article with steel cables as high as 200 feet. Then the test article is released to swing pendulum-style onto an impact surface of water in the Hydro Impact Basin, concrete or soil. Just before impact, the test article is pyrotechnically released from the cables to allow free flight conditions. LandIR has a parallel winch system that increases the ability to accurately control impact attitude conditions such as pitch and pitching rate. The LandIR has a 64,000-pound capacity and test articles can reach resultant velocities of more than 70 miles per hour.

Additionally, the VTA located on the Northwest leg of the gantry can be used to lift a test article up to 60 feet high and drop it vertically onto concrete, soil, or water.



Facility Benefits

- Attitude and velocity control of test articles to be impact or crash tested
- Full-scale and sub-scale capabilities
- Vertical or horizontal velocity impacts and combined velocity impacts
- Realistic data from structures and occupants under dynamic loads
- Dynamic data to correlate and calibrate transient dynamic Finite Element Models (FEM)
- Dynamic data collected with onboard, hardened data acquisition system at rates as high as 50,000 samples per second for 300+ channels
- Accelerations, strains, displacements, loads, angular rates, temperature, IRIG time code, and pressures can be collected with data system
- 3-D photogrammetry at 1000 fps correlated with data acquisitions system using IRIG time code
- Instruments and Hybrid I and Hybrid II Anthropomorphic Test Devices (crash dummies)

Facility Applications

- Drop tests of fixed- and rotary-wing aircraft for crashworthiness and occupant survivability
- Landing system dynamics and performance
- Full-scale water landing tests
- Retrorocket landing system tests
- Structural integrity of aircraft, spacecraft and components
- Dynamic analysis and test correlation
- Sensor evaluations for autonomous landing and hazard avoidance



Capabilities

LandIR Facility

A-frame, steel structure: 240 ft high, 265 ft wide and 400 ft long
Parallel-winch swing system can produce impact velocities in excess of 60 mph

Vertical Test Apparatus

70-foot drop tower
Five-ton lift capacity
Vertical velocities up to 45 mph

Data Acquisition and Processing

Data acquisition

A 320-channel capacity, 100g-hardened data acquisition system may be located onboard or external to test vehicles

Post-processing services available upon customer request

Analytical services available upon customer request



Contact Information

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